

# Pro Formas

(Welch, Chapter 21)

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***FIXME***

Not yet fixed for ed 5.

# 1: The Purpose

- ▶ **Pro Formas** (*PFs*) project the future,
  - ▶ but in the language of business.
- ▶ A *PF* is a hypothetical future financial statement.
- ▶ **Forecasting is *very* difficult!**
- ▶ Harder for young uncertain businesses.
- ▶ ***Integrative: PF have a little of everything.***
- ▶ Didactic problem: very business specific.

## 2: Precision?

- ▶ *Fuhgeddaboutit*
  - ▶ The future is tough to predict.
  - ▶ Realistically, just try be better than others.
  - ▶ Most important, get lucky!
  - ▶ Other than luck, forecasting and reacting is what business success is all about.
  - ▶ Learn by doing. Learn from past failures.

## 3: Internal Users

- ▶ Entrepreneurs, Owners, and Managers:
  - ▶ Have access to private information.
  - ▶ Have to optimize firm choices.
  - ▶ *PFs* are useful to analyze the effect of a new policy (e.g., a new project).

## 4: External Users

- ▶ Analysts wanting to understand firm value.
  - ▶ Have only access to public information.
  - ▶ No optimization problem.
  - ▶ Managerial choices are just another uncertainty.
  
- ▶ In-between, acquisition analysts.

## 5: Structure: Parts

- ▶ Early Growth Phase,
- ▶ Late Mature Phase,
- ▶ Transition Between Them,
- ▶ Forecasts (Sales!) and CoC.

## 6: Structure: Early Growth Phase

Growth rate  $g$  can exceed the CoC  $E(r)$ , even by a wide margin.

- ▶ Typically, the CoC is high (ICM).
- ▶ Key danger: firm can run out of working capital.
- ▶ *Not* the “long-term equilibrium.”



## 7: Structure: Later Mature Phase

Growth rate  $g$  is less than the CoC ( $g < E(r)$ ).

- ▶ Typically,  $g$  is the inflation rate.
- ▶ Typically, the CoC is low.
- ▶ Not much excess rents (profitability).
- ▶ BUT the mature phase starting level depends on the briskness of growth phase.
  - ▶ The two phases are *not* separate.

## 8: Structure: Transition Location?

When should the growth phase end and the mature phase start?

## 9: The Uncanny Valley

What's hardest to forecast and agree on:

- ▶ The SF49ers will win next Sunday?
- ▶ The SF49ers will win in 2 years?
- ▶ The SF49ers will win in 30 years?

Where will you get most disagreement?

- ▶ What is the effect of discounting?
- ▶ What is the effect of long-term economics?

# 10: Uncanny Business Forecasts

Short-Term (like this month).

- ▶ relatively predictable?

Medium-Term (like 2-6 years).

- ▶ hmmm....

Long-Term (like 10+ years).

- ▶ economic rents will be low or zero.
- ▶ Plus, discounting reduces the impact of errors.

# 11: Check Yourself

Memory is short. Hottest company...

- ▶ 10 years ago? Where is it now?
- ▶ 20 years ago? Where is it now?
- ▶ 40 years ago? Where is it now?
- ▶ 80 years ago? Where is it now?

Where will today's be in 20 years?

## 12: Typical T Break Points

The break point between the startup and mature phase is commonly 5-10 years out.

- ▶ Occasionally up to 20 years.
- ▶ Occasionally as low as 3 years.
- ▶ Rarely much better or worse.
- ▶ Maybe where growth has declined to inflation.

## 13: Shortcut (*Not-Pro Forma*)

If you only want value, do you really need to project a full *PF* (with IS, CFS, and BS)?

Can you just forecast cash flows?

Or even just net income?

## 14: A Real Sales-Based *Pro Forma*

Almost all real-world *PFs* are based primarily on a **sales-based forecast**.

How do you predict sales???

- ▶ Steady sales growth?
- ▶ Advance knowledge of products and customers?
- ▶ Darts?

Sales predictions are very project specific.

- ▶ Useless to cover one in detail here.



# 15: Sales Forecasts

## **Use all your knowledge**

- ▶ Do not ignore historical data and analysis.
- ▶ Do not blindly believe statistical models.
- ▶ Do not be dogmatic.

## **Forecasting sales is crucial!**

- ▶ Great advice—just like “buy low, sell high.”

## 16: Sales-Based *Pro Forma*

Now what?

- ▶ Pretend that you have the future sales.
- ▶ Predict other target financial statement variables.
  - ▶ If your sales projection really turns out as you predicted,
  - ▶ chances are that the rest won't be too bad.

# 17: Interesting Targets

The most common target variables of interest (financial statement components and items derived) are:

- ▶ Economic Cash Flows for NPV:
  - ▶ CF from Operations
  - ▶ CF from Investing
- ▶ *Working Capital* Balance:
  - ▶ cumulative sum of cash.
- ▶ Various financial health ratios.
  - ▶ e.g., *current ratio* (current assets / current liabilities).

# 18: Target Forecasting

Targeted variables are often decomposed into fixed and variable components of sales and/or sales growth.

- ▶ Run-of-the-mill decompositions ratios are viable but rarely ideal. Think “crutch.”

If you have a better informed forecast, use it.

- ▶ e.g., should you predict a target differently and independently?

# 19: Proportional Relation

$$\text{Item}_t = a \cdot \text{Sales}_t = 40\% \cdot \text{Sales}_t$$

- ▶ The Item could be COGS, or SG&A, or Taxes.

This formula says that this financial statement item is always 40% of sales.

## 20: Linear Growth Forecast

$$\% \Delta \text{Item}_{t+1} = a_0 + b_0 \cdot \% \Delta \text{Sales}_{t+1}$$

Use

$$\blacktriangleright \text{Item}_{t+1} = a \cdot \text{Item}_t + b \cdot \text{Item}_t \cdot \left( \frac{\text{Sales}_{t+1}}{\text{Sales}_t} - 1 \right)$$

$a$  is the “fixed” component.

$b$  is the “variable” component.

$\blacktriangleright b$  measures how the item changes with sales.

## 21: COGS Linear Forecast

For COGS (CGS), estimated using all Compustat firms (publicly-traded firms, often large),



$$CGS_{t+1} \approx 6\% \cdot CGS_t + 95\% \cdot CGS_t \cdot \% \Delta Sales_t$$

**Summary:** Fixed: 6%, Variable: 95%.

## 22: Sample Use of COGS Forecasts

$$COGS_{2000} = \$100.$$

Consider 3 different growth scenarios.

- ▶ If  $(Sales_{t+1}/Sales_t) - 1 = 0$ :  
 $COGS_{2001} \approx 6\% \cdot \$100 + 95\% \cdot \$100 \cdot 1 = \$101.$
- ▶ If  $(Sales_{t+1}/Sales_t) - 1 = +10\%$ :  
 $COGS_{2001} \approx 6\% \cdot \$100 + 95\% \cdot \$100 \cdot 1.1 = \$110.50.$
- ▶ If  $(Sales_{t+1}/Sales_t) - 1 = -10\%$ :  
 $COGS_{2001} \approx 6\% \cdot \$100 + 95\% \cdot \$100 \cdot 0.9 = \$91.50.$



## 23: Warnings

Estimated coefs are not *deus-ex-machina*.

Estimated coefs were the result of how many firms responded over decades.

- ▶ Hopefully, firms responded well to their own situations—and hopefully so will you.

Do not believe the estimated formula is optimal (or even appropriate) for your firm!

- ▶ Demand/supply based, industry/firm based, etc.

## 24: Other IS Items I: SGA, Dep

### Sales, General, Administrative Expenses



$$SGA_t \approx 1/3 \cdot SGA_{t-1} + 2/3 \cdot SGA_{t-1} \cdot \% \Delta Sales_t$$

**Summary:** Fixed: 33%, Variable: 67%.

### Depreciation

Perhaps same as last year's?

Often well known and predictable in advance from past capex.

## 25: Other IS Items II: Int, Tax

### Interest Expense?

Better predicted from leverage obligations.

### Taxes



$$TX_t \approx -0.33 \cdot TX_{t-1} + 1.16 \cdot TX_{t-1} \cdot \% \Delta \text{Sales}_t$$

**Summary:** -33% Fixed, +116% Variable.

### Nomen est Omen

Unusual Expenses? Extraordinary Items?

## 26: Other Financial Statements

### Balance Sheet:

- ▶ Usually, stock-based variables have large persistence and are thus forecastable.

### Cash Flow Statement:

- ▶ Usually, cash flows are highly variable.
- ▶ Net Income may be better than CFs.
- ▶ *Oi Wei! Pray.*

## 27: Now What?

You now have a complete set of “pretend” financial statements.

Presume this will be the actual path. You can

- ▶ calculate the path of *Working Capital*, or
- ▶ calculate the path of *Financial Ratios*.
  - ▶ Does the firm seem “sound”?

*PS: Also, try different Sales Assumptions (Scenario Analysis)*

## 28: Terminal Value Estimate (TVE)

Start with the final year of the growth period.

- ▶ Assume, heroically, that this will be correct.
- ▶ Use *cash flow* or *earnings*.

*What would the firm sell for at that moment?*

## 29: Common TVE CRUTCH

The growing perpetuity formula is often used to estimate the presumed future *selling value*,

- ▶ Assume growth period's final CF or NI,
- ▶ Assume  $g$  near inflation, and
- ▶ Assume  $E(r)$  like the stock market.

How reasonable is the resulting valuation?

- ▶ Do not shut off brain!

## 30: TVE Questions

In established firms (e.g., Intel), what fraction of *PF* firm value comes from CFs beyond 10 years?

In startup firms, what should it be?

How accurate can you expect to be here?

- ▶ Does sophistication and care help?



# 31: Cost of Capital

The CoC is  $E(r)$ .

- ▶ Needed input for NPV calculations.
- ▶ Needed input for the TVE calculation.

The most common standard: the CAPM.

- ▶ There is no good scientific reason for this.
- ▶ The evidence tells us that the CAPM sucks.
- ▶ Use something reasonable.
- ▶ Private firms “deserve” a *liquidity discount*.

## 32: Best Practice

Be superclear in justifying your assumptions (with solid economics).

- ▶ Usually done with ample footnotes,
- ▶ even more so than in actual financial statements.
- ▶ A reader must be able to replicate your *PF*.

## 33: Be Humble

Scenario Analysis: For various *PFs*:

- ▶ optimistic (say 80%),
- ▶ realistic (expected).
- ▶ pessimistic (say 20%; often **death**),

Sensitivity Analysis:

- ▶ How sensitive is value to your assumptions?
- ▶ Can you use a MC simulation to assess  $E(V)$ ?

## 34: Be Critical

**What are the incentives of the *PF* creator?**

- ▶ What are your's?
- ▶ How much sense does it make?
  - ▶ Do you want “pseudo-science”?
  - ▶ Do you want “pseudo-accuracy”?
  - ▶ Are you being set up for a fool?

## 35: *PFs* for Policy Changes

Of concern if you are the decision maker.

Changes are often tough to decide in advance.

And don't forget strategic options!

- ▶ Intrinsically, *PFs* are not well-suited to options, because they evaluate only one path.

## 36: Example: Debt Refi Policy Changes

Promised cost of debt: easier.

Expected cost of debt: harder.

Effect of debt on tax shelter: easy.

Effect of debt on overall cost of capital: harder.

- ▶ what will the effect be on equity CoC?

Effect of debt on cash flows: path-specific.

## 37: Autopsy and Calibration

How well does your *PF* fit current market values (if there any)? Can they be anchors?

### **Calibration**

- ▶ Yes, *fudging*—but very important.
- ▶ unless you want to look like bozo the clown?